(12) UK Patent Application (19) GB (11) 2 261 358 (13) A

(43) Date of A publication 19.05.1993

(21) Application No 9124054.9

(22) Date of filing 13.11.1991

(71) Applicant
Salt & Son Limited

(Incorporated in the United Kingdom)

Saltair House, Lord Street, Nechells, Birmingham, B7 4DS, United Kingdom

(72) Inventor
Alan Wilson

(74) Agent and/or Address for Service
Forrester Ketley & Co
Chamberlain House, Paradise Place, Birmingham, B3 3HP, United Kingdom

(51) INT CL[5]
A41B 11/00, A61F 13/06

(52) UK CL (Edition L)
A3V V1A2B V1A2X V6C2

(56) Documents cited
GB 1414128 A GB 1177530 A GB 0717140 A
US 4015296 A

(58) Field of search
UK CL (Edition K) A3V
INT CL[5] A41B, A61F
Online databases: WPI

(54) **Sock for limb stump**

(57) The sock comprises a tubular element (10) with a closed end portion (11) and an open end portion (12), the open end portion having a recess (16) extending towards the closed end portion of the sock. The free edge (15) at the open end portion of the sock may be inclined to the centre line of the sock. The recess (16) may be V-shaped and have hook and loop fastening means (24) associated therewith.

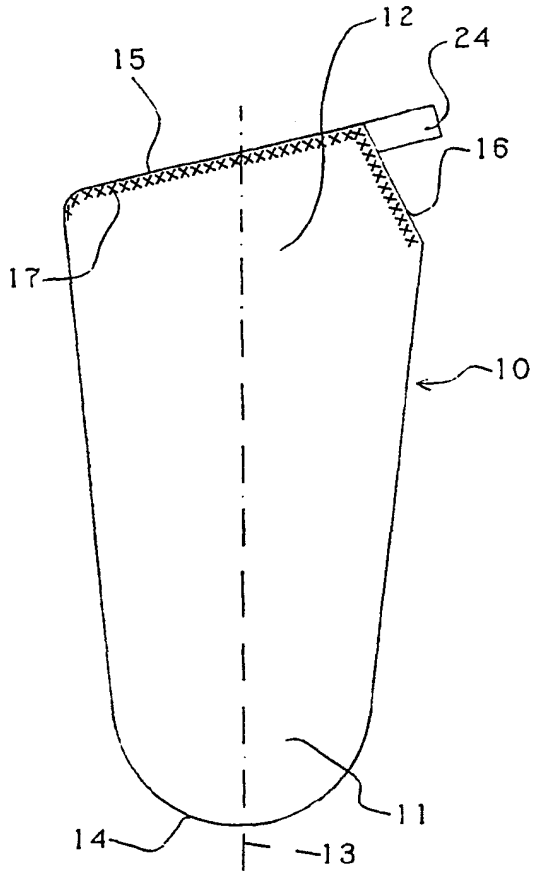


FIG 1

At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

The claims were filed later than the filing date within the period prescribed by Rule 25(1) of the Patents Rules 1990.

This print takes account of the replacement documents submitted after the date of filing to enable the application to comply with the formal requirements of the Patents Rules 1990.

GB 2 261 358 A

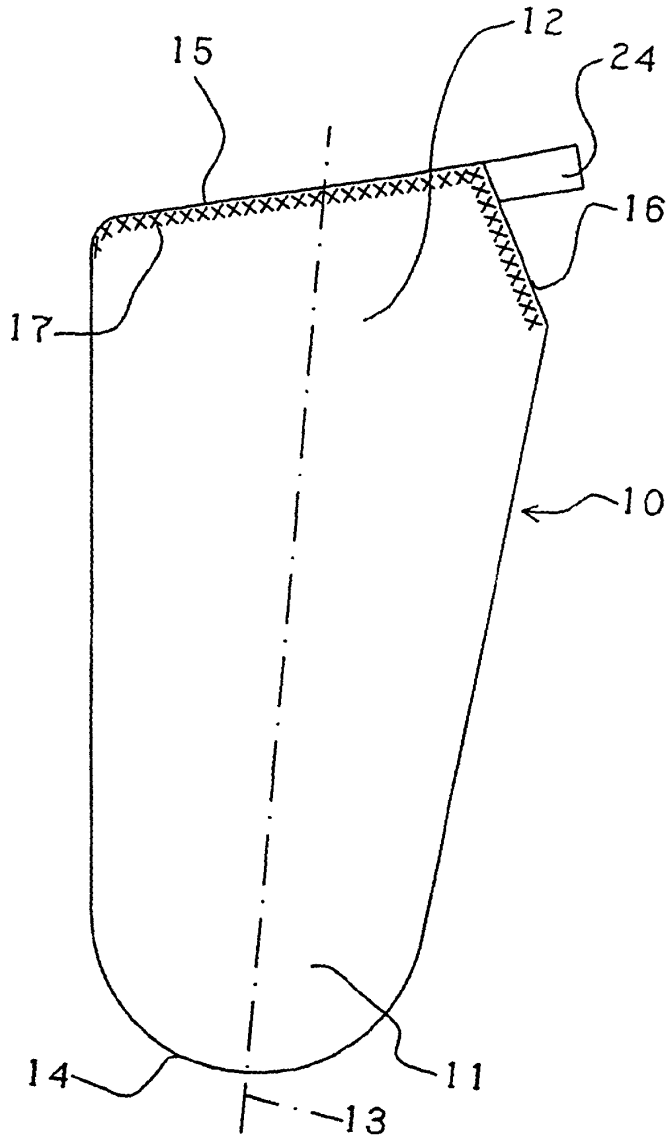
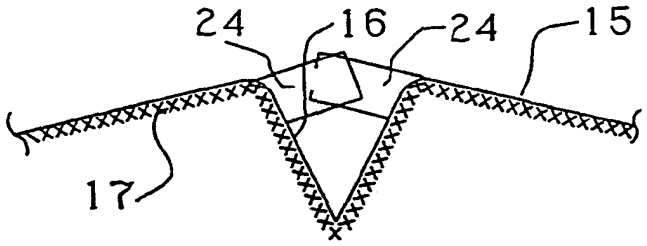


FIG 1

FIG 2



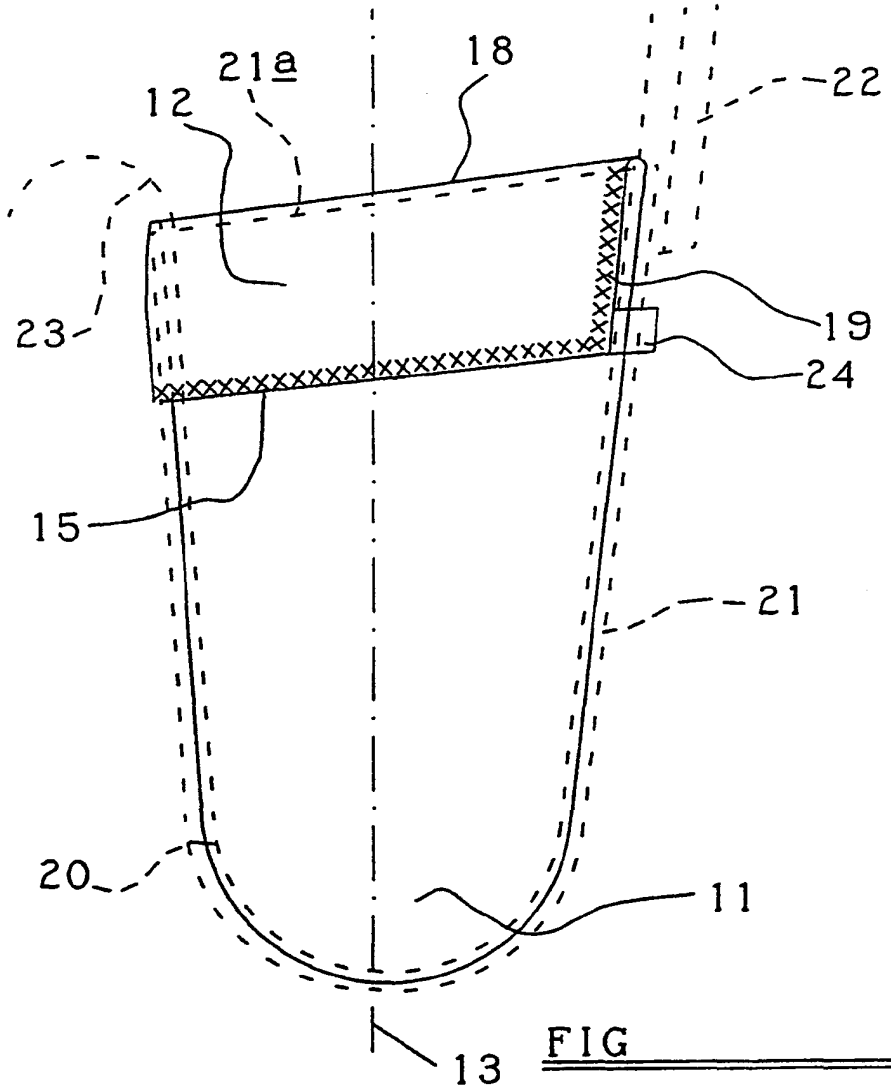


FIG 3

Title: Sock

Description of Invention

This invention relates to a sock for use on a portion of a human limb (herein termed the stump) of which an end portion is not present, e.g. by virtue of having been amputated. A prosthesis may be fitted on to the stump to substitute for the end portion of the limb, the prosthesis having a socket means wherein the stump engages.

The sock according to the invention has been devised for use where the lower portion of a person's leg is absent from a position either above or below the knee and the sock is to extend to the groin area of the user. Any measure which can be adopted to improve the comfort of the user is generally desirable.

A typical "above-knee" prosthesis to substitute for the absent lower part of the leg comprises, as above referred to, a socket means adapted to receive the stump of the thigh. In some cases, the "below knee" amputee needs to wear a prosthesis which fits onto the amputee's thigh. for example if the remaining part of the limb, although present, is deformed or weakened. In either case the prosthesis may be arranged to be connected by a support member, which may be termed a side steel, to a support structure worn at the waist of the user, for the purpose of ensuring that the prosthesis does not become detached from the stump. Such a support member is usually arranged to extend alongside the hip and upper thigh of the user and is pivotally connected to the prosthesis and/or the support structure. Since, when standing, approximately 50% of the body weight of the user must be transferred between the stump and the socket means of the prosthesis, the wearing of a sock on the stump is virtually a necessity to prevent chafing of the stump causing at least discomfort and potentially more serious consequences for the user.

It is broadly the object of the present invention to provide a sock which enables the comfort of a user to be improved, in one or more of the above respects.

According to one aspect of the present invention, we provide a sock for use on the stump of a limb, the sock comprising a tubular element having a closed end portion and an open end portion, said open end portion having a recess extending towards the closed end portion of the sock.

The sock is intended to be used with the open end portion everted so that the open end portion is folded back over the top of the prosthesis which provides for greater comfort of the user as the top edge of the prosthesis is cushioned. With the sock in this condition, it has at its open end a double thickness of the material from which it is made, with the exception of where the recess is provided in the open end portion of the sock. The sock is worn with the recess at the outside of the upper thigh of the user, and the position of the recess permits the top of the sock to be folded back without obstruction by the side steel. Moreover, the provision of the recess avoids any significant decrease in the resilience of the sock when everted.

Preferably the recess is substantially V-shaped.

The two parts of the free edge of the sock adjacent the recess may be provided with fastening means, to enable them to be fastened together. Such fastening means may comprise portions of hook and loop fastening material of the kind known as Velcro (Trade Mark).

According to another aspect of the invention, we provide a sock for use on the stump of a limb, the sock comprising a tubular element having a closed end portion and an open end portion, said open end portion having a free edge which, when the sock is viewed perpendicularly to a surface on which it is laid in flat configuration, is inclined to a centre line extending between the closed and open end portions of the sock.

A sock of this configuration is intended to be used so as to extend to a higher point at the outside of the thigh of the user than in the groin region,

thereby enhancing user comfort. Preferably it is used, as above referred to, with its open end portion everted.

The sock may be used with a prosthesis which has an inclined top, the open end portion being everted so that the open end portion is folded back over the top of the prosthesis so that the top edge of the prosthesis is cushioned, and the width of the sock may correspond to the width of the prosthesis.

Preferably both aspects of the invention are combined in a sock, i.e. the open end portion thereof has both a recess and an inclined free edge. When the sock is viewed in the laid-flat configuration with the recess at one side of the sock, the free edge is preferably at a maximum distance from the closed end of the sock immediately adjacent the recess and at a minimum distance from the closed end of the sock opposite the recess.

The sock may be substantially symmetrical about the centre line extending between its closed and open end portions with the exception of the open end portion wherein it may have said recess.

The closed end portion of the sock may be generally of part-circular configuration.

Between its closed and open end portions, the sock may taper so as to be wider adjacent the latter, approximately to correspond to the normal shape of the upper thigh.

A sock according to the invention may be of any suitable material, e.g. terry towelling or a knitted material, of a fibre such as wool or cotton. The edge, including the recess, of the open end portion may be oversewn to prevent it from fraying.

The invention will now be described by way of example with reference to the accompanying drawings, of which:-

Figure 1 is a plan view of a sock according to the invention laid flat:

Figure 2 is a developed view of part of the open end portion of the sock; and

Figure 3 is a plan view of the sock laid flat with its open end portion everted.

Referring firstly to Figures 1 and 2 of the drawings, a sock comprises a tubular element 10 of textile material, namely a knitted yarn of a fibre such as wool. The tubular element has a closed end portion 11 and an opposite, open, end portion 12. The main part of the tubular element, as viewed in its laid-flat configuration in Figures 1 and 3 of the drawings, is substantially symmetrical about a centre line 13 extending between the end portions of the elements, the closed end portion 11 having a curved, substantially part-circular end 14 from which the sock widens to its open end portion 12. The part-circular shape of the end 14 may be provided either by virtue of the process of knitting the sock, or by the provision of sewn seams in the end portion 11.

The open end portion 12 of the sock has a free edge 15 which is mainly linear but includes a recess 16 extending towards the closed end portion of the sock. The recess 16 is substantially V-shaped as seen in developed view of the end portion 12 of sock as shown in Figure 2. If desired the recess may be of another shape than V-shaped, such as U-shaped In the laid-flat view of Figure 1, the linear edge 15 is inclined to the centre line 13 of the sock so that it is at a greater distance from the closed end portion of the sock immediately adjacent the recess 16 than it is opposite the recess 16. The free edge 15 including the recess 16 is oversewn as indicated at 17 to prevent it from fraying.

Adjacent the recess 16, the adjacent parts of the sock at the free edge 15 thereof are provided with respective fastening means 24 engagable with one another. The fastening means may comprise portions of hook and loop fastening material of the kind known as Velcro (Trade Mark), engagable with one another when pressed together and separable by being pulled apart. Alternatively interengagable fastening means such as a hook and eye, or a press stud or studs, could be provided.

Figure 3 shows how the sock according to the invention would be used, fitted on a stump, shown in outline by broken line 20, comprising part of the thigh

of a user. There is also indicated in outline part of a socket means 21 of an above-knee prosthesis, and a support member or side steel 22 connected to the socket means 21 and extending upwardly from the socket means 21 to be connected to a support structure secured at the waist of the user.

The sock is intended to be used with the open end portion 12 thereof everted so as to be folded over the outside of the upper end portion of a prosthesis having an inclined upper edge 21a. The open end portion 12 is everted by a uniform distance across the width of the sock, approximately equal to the amount by which the V-shaped recess 16 extends towards the closed end of the sock, so that the sock presents an open end 18 inclined to the centre line 13 at substantially the same inclination as the linear part 15 of the free edge of the sock. When the sock is in this configuration, it has at its open end a double thickness of material with the exception of where the recess 16 is provided, at which it has only a single thickness of material as indicated at 19. The fastening means 24 may be used to connect the free edge parts of the sock, adjacent the recess, together on the outside of the prosthesis so that such edge parts are not left lying loose and unconstrained.

The support member 22 extends close to the side of the upper thigh of the user, where there is only the single thickness of material at 19 at the upper end of the sock. Thus, by virtue of the recess 16 in the open end portion of the sock, the side steel 22 does not provide any obstruction to folding over of the sock.

The corresponding inclination of the sock and prosthesis avoids any bunching in the groin area of the user hence providing enhanced comfort for the user.

If desired the sock can be worn without a prosthesis on the stump. The above described inclination of the upper edge of the sock prevents bunching of the sock in the groin region while the recess ensures that the resilience of the sock is not significantly decreased, thus enhancing the comfort of the user.

The features disclosed in the foregoing description, or the following claims, or the accompanying drawings, expressed in their specific forms or in terms of a means for performing the disclosed function, or a method or process for attaining the disclosed result, as appropriate, may, separately or in any combination of such features, be utilised for realising the invention in diverse forms thereof.

CLAIMS

1. A sock for use on the stump of a limb, the sock comprising a tubular element having a closed end portion and an open end portion, said open end portion having a recess extending towards the closed end portion of the sock.

2. A sock according to Claim 1 wherein said recess is substantially V-shaped.

3. A sock according to Claim 1 or Claim 2 wherein parts of the free edge of the sock adjacent the recess are provided with fastening means to enable them to be fastened together.

4. A sock according to Claim 3 wherein said fastening means comprises portions of hook and loop fastening material.

5. A sock for use on the stump of a limb, the sock comprising a tubular element having a closed end portion and an open end portion, said open end portion having a free edge which, when the sock is viewed perpendicularly to a surface on which it is laid in flat configuration, is inclined to a centre line extending between the closed and open end portions of the sock.

6. A sock according to any one of Claims 1 to 4 wherein said open end portion of the sock has a free edge which, when the sock is viewed perpendicularly to a surface on which it is laid in flat configuration, is inclined to a centre line extending between the closed and open end portions of the sock.

7. A sock according to Claim 6 wherein, viewed in said laid-flat configuration with the recess at one side of the sock, the free edge is at a maximum distance from the closed end of the sock immediately adjacent the recess and at a minimum distance from the closed end of the sock opposite the recess.

8. A sock according to any one of Claims 5 to 7 wherein the sock is substantially symmetrical about said centre line with the exception of the open end portion.

9. A sock according to any one of the preceding claims wherein the closed end portion of the sock is generally of part-circular configuration.

10. A sock according to any one of the preceding claims wherein, between its closed and open end portions, the sock tapers so as to be wider adjacent said open end portion.

11. A sock according to any one of the preceding claims, made of terry towelling or a knitted fibre material.

12. A sock according to Claim 11 wherein the edge of said open end portion is oversewn to prevent fraying.

13. A sock according to any one of the preceding claims wherein said open end portion of the sock is everted.

14. The combination of a sock according to Claim 13 with a prosthesis, wherein said everted open end portion of the sock is folded back over the top of the prosthesis.

15. The combination according to Claim 14 wherein said sock is as claimed in Claim 1 and said recess lies adjacent a side steel of the prosthesis.

16. A sock substantially as hereinbefore described with reference to the accompanying drawings.

17. Any novel feature or novel combination of features described herein and/or in the accompanying drawings.

Patents Act 1977
Examiner's report to the Comptroller under Section 17 (The Search Report)

Application number

GB 9124054.9

Relevant Technical fields

(i) UK Cl (Edition K) A3V

(ii) Int Cl (Edition 5) A41B; A61F

Search Examiner

D BUCKLEY

Databases (see over)

(i) UK Patent Office

(ii) ONLINE DATABASES: WPI

Date of Search

30 NOVEMBER 1992

Documents considered relevant following a search in respect of claims 1-4

Category (see over)	Identity of document and relevant passages	Relevant to claim(s)
X	GB 1414128 (ST PETER SPORTING GOODS) See eg. Figure 4	1, 3 and 4
X	GB 1177530 (ADAMS) Cut away section 1	1 and 2
X	GB 717140 (TENOVA LTD) Whole document especially Figure 10	1 and 2
X	US 4015296 (MALICK) Whole document	1 and 3

Category	Identity of document and relevant passages	Relevant to claim(s)

Categories of documents

X: Document indicating lack of novelty or of inventive step.

Y: Document indicating lack of inventive step if combined with one or more other documents of the same category.

A: Document indicating technological background and/or state of the art.

P: Document published on or after the declared priority date but before the filing date of the present application.

E: Patent document published on or after, but with priority date earlier than, the filing date of the present application.

&: Member of the same patent family, corresponding document.

Databases: The UK Patent Office database comprises classified collections of GB, EP, WO and US patent specifications as outlined periodically in the Official Journal (Patents). The on-line databases considered for search are also listed periodically in the Official Journal (Patents).

Published 1993 at The Patent Office, Concept House, Cardiff Road, Newport, Gwent NP9 1RH. Further copies may be obtained from Sales Branch, Unit 6, Nine Mile Point, Cwmfelinfach, Cross Keys, Newport, NP1 7HZ. Printed by Multiplex techniques ltd, St Mary Cray, Kent.